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***Diplommatina chaoi* (Prosobranchia: Diplommatinidae), A New Species from Southern Taiwan**

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Introduction

The family Diplommatinidae Pfeiffer, 1856, is distributed in Asia, Europe, and Central America (Thiele, 1992). It comprises two subfamilies: Diplommatininae Pfeiffer, 1856, and Cochlostomatinae Tielecke, 1940 (Solem, 1959). Most of the species of Asian Diplommatinidae belong to the subfamily Diplommatininae. Nine of the 10 described species and subspecies of diplommatinines in Taiwan belong to the subgenus *Sinica* Moallendorff, 1885, of the genus *Diplommatina* Benson, 1849, and the other belongs to the genus *Palaina* Semper, 1865 (Kuroda, 1941; Pilsbry & Hirase, 1905).

Nine specimens of *Diplommatina* were collected in Pingtung County on 25 August 1997, and six in Taitung County on 27 August 1997 (Figure 1). Comparisons of morphological characters with other species revealed that the present specimens differ from all recognized species in the genus. This new species is described below.

Diplommatina (*Benigoma*) ***chaoi*** Hwang, Chang & Chang, sp. nov.

(Figures 2–5, 7)

Description: The shell is minute, 3.67–4.44 mm long, dextral, turreted, and red-brown in color. The number of whorls is 7.5–8.75. The upper five whorls are slightly transparent. The first six whorls are strongly convex. The apex is concave in outline due to allomorphic expansion of the upper whorls. The penultimate whorl is the widest. The body whorl is slightly narrower than the penultimate whorl.

The first two whorls are embryonic whorls with smooth surfaces. The lower three-fourths of the third to fifth whorls is ornamented with thin, curved, axially lamellate ribs when unworn. There are 17 to 19 ribs on each ornamented whorl. The spaces between ribs vary on the three whorls from 0.16 mm to 0.27 mm in width, gradually becoming more widely spaced toward the fifth

whorl. The penultimate whorl and the first half of the body whorl are smooth, but have short, straight, oblique striae below the suture. The last half of the body whorl has very fine and dense striae (Figure 3). The umbilicus is closed. A transverse lamella (TL) is situated in the last whorl above the aperture on the outer wall (Figure 5). The upper end of the transverse lamella reaches the suture but does not extend farther onto the parietal wall. The first parietal lamella (PL1) is close to the suture, and the second parietal lamella (PL2) is close to the columella. The former is more elevated and longer than the latter. The first and second parietal lamellae reach a quarter of a whorl in length on the roof of the body whorl (Figure 7). A palatal plica is absent.

The aperture is subspherical. The peristome is thickened, expanded, and doubled, but not reflected. The parietal callus is thin. The columellar lamella is strong, pointed downward from aperture view, extended, and reaches half a whorl in length, not close to the transverse lamella, and slightly concave along its dorsal side (Figure 5).

The operculum is thin, semitransparent, and multispiral.

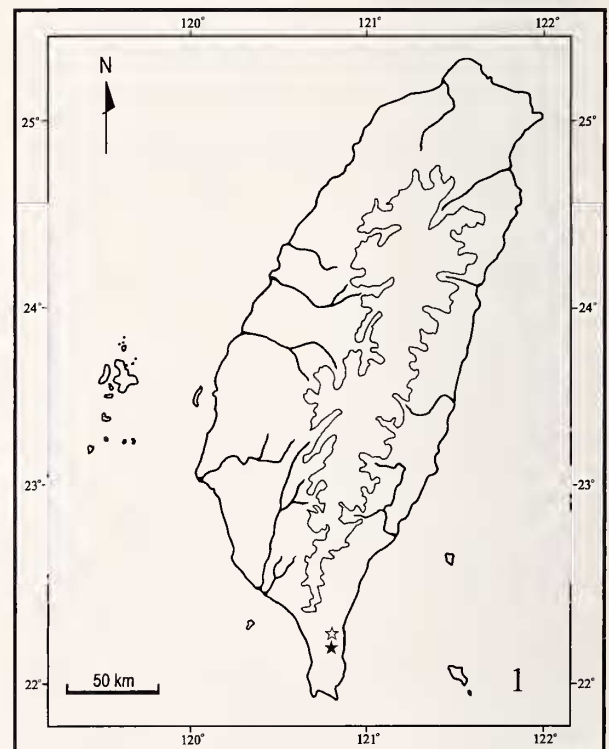
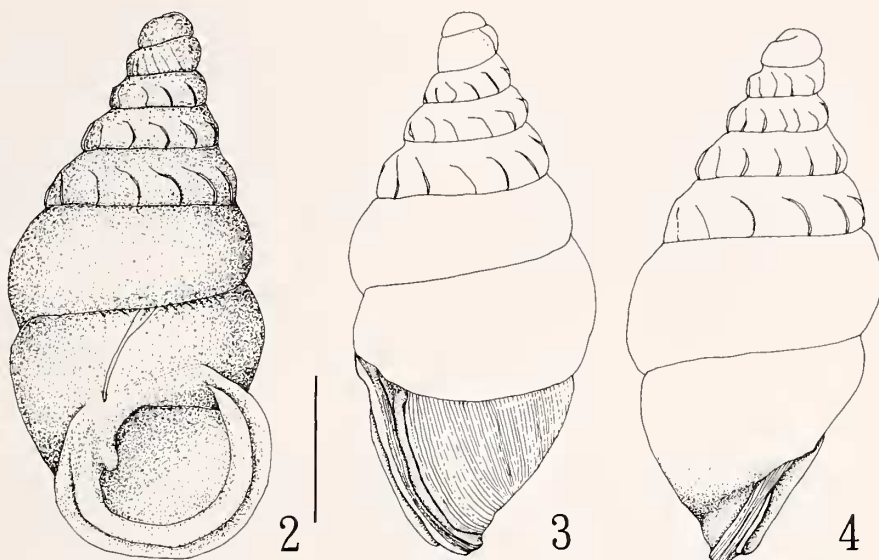


Figure 1. Map of Taiwan. ★ Type locality of *Diplommatina chaoi* Hwang, Chang & Chang, sp. nov. (Neiwen, Shihtzu, Pingtung County); ☆ Another locality (Kueitien, Dajen, Taitung County).

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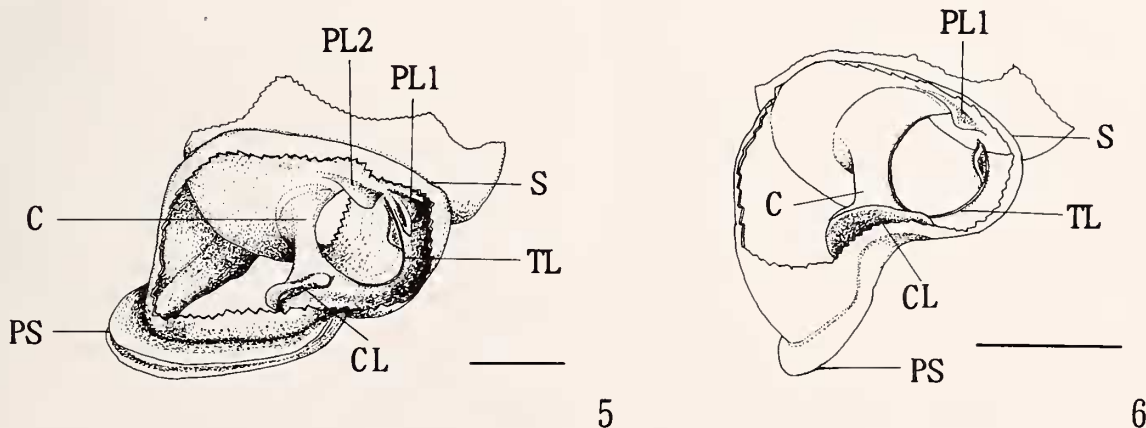
Figures 2–4. *Diplommatina chaoi* Hwang, Chang & Chang, sp. nov. Holotype, NMNS-002897-1. Figure 2. Apertural view. Figure 3. Right lateral view. Figure 4. Left lateral view. Scale line = 1 mm.

Measurements: The measurements of the holotype are: shell length 3.67 mm, shell width 1.76 mm, number of whorls 7.75. The measurements based on 15 specimens are: shell length 3.67–4.44 mm (average 4.01 mm), shell width 1.76–2.18 mm (average 1.98 mm), number of whorls 7.5–8.75.

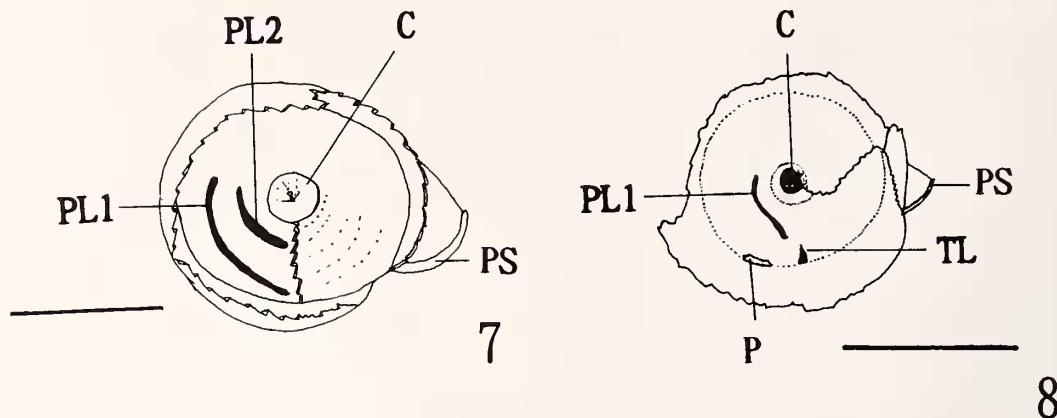
Type locality: Neiwen, Shihtzu, Pingtung County, Taiwan (22°12'87"N, 120°50'61"E), altitude 330 meters. Nine specimens were collected by Chung-Chi Hwang on 25 August 1997.

Distribution: Type locality and Kueitien, Dajen, Taitung County (22°15'28"N, 120°49'73"E) (collected by David Chao and his associates on 27 August 1997).

Type materials: The holotype (NMNS-002897-1) is deposited in the National Museum of Natural Science together with four paratypes (NMNS-002897-2, 002897-3, 002897-4, and 002897-5). Four paratypes are deposited in the private collections of Chung-Chi Hwang, Kwan-Min Chang, Hsueh-Wen Chang, and Akira Tada, respectively.



Figures 5, 6. Figure 5. *Diplommatina chaoi* Hwang, Chang & Chang, sp. nov. A cracked specimen collected at type locality 15 December 1997. Upper left-side view with body whorl partially removed. Figure 6. *Diplommatina taiwanica*. Upper left-side view with body whorl partially removed. Abbreviations: C, columella; CL, columellar lamella; PL1, first parietal lamella; PL2, second parietal lamella; PS, peristome; S, suture; TL, transverse lamella; Scale line = 0.5 mm.



Figures 7, 8. Figure 7. *Diplommatina chaoi* Hwang, Chang & Chang, sp. nov. A cracked specimen collected at type locality 15 December 1997. Apical view of the lamellae (upper portion above body whorl has been removed). Figure 8. *Diplommatina taiwanica*. Apical view of the lamella (upper portion above body whorl has been removed). Abbreviations: C, columella; PL1, first parietal lamella; PL2, second parietal lamella; P, palatal plica; PS, peristome; TL, transverse lamella; Scale line = 1 mm.

Etymology: The species is named after Dr. David Chao (Department of Biological Sciences, National Sun Yat-Sen University) who offered his valuable specimens for this study.

Ecology: The nine type materials were collected in the litters of a ditch along a hillside. They were probably falling from the forest above. The forest is a secondary tropical monsoon forest. We tried to find any live individuals in the forest but in vain. The other six specimens collected in Taitung County were collected on the soil surface.

Remarks: The present new species differs from other known Taiwan *Diplommatina* species and neighboring areas in its turreted shell, lamellate ribs, and the lack of palatal plica. Therefore, it is assigned to the subgenus *Benigoma* Kuroda, 1928. Species of the allied subgenus *Sinica* possess a palatal plica. *Sinica* also is characterized by radula on the flat upper side of the lateral teeth (Ando, 1969). Live specimens of this new species were not collected, so that radular comparison was not available. All of the *Diplommatina* in Taiwan belong to the subgenus *Sinica*. Only two species, *D. oshimae* Pilsbry, 1901, and *D. pudica* Pilsbry, 1902, in Japan belong to *Benigoma* (Kuroda, 1963; Habe, 1943). This is the first record of *Benigoma* in Taiwan. The present new species differs from these two in its larger shell size, its smooth penultimate whorl, and the first half of the body whorl.

The lamellar morphology of *Diplommatina* of Taiwan has not been described. We selected a common species, *D. (Sinica) taiwanica* Pilsbry & Hirase, 1905 (collected from Feng-Huang-Ku, Nantou County) as a reference. The morphology of the columellar lamella is a useful character used in taxonomy at the specific level, and al-

lows comparison with that of *D. chaoi*. The columellar lamella of *D. taiwanica* closely approaches the transverse lamella, and smoothly extends without an indentation such as occurs in *D. chaoi* (Figures 5, 6).

Diplommatina taiwanica has only one parietal lamella (Figures 6, 8). This is the same as several Japanese species of the subgenus *Sinica* (Ando, 1968a, b). The second parietal lamella (Figures 5, 7) is an additional character found in this new species. The two parietal lamellae are situated on the parietal wall of the body whorl. However, the parietal lamella is rarely described. Further examination is needed to reveal the significance of the parietal lamellae for the subgeneric taxonomy of the genus *Diplommatina*.

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